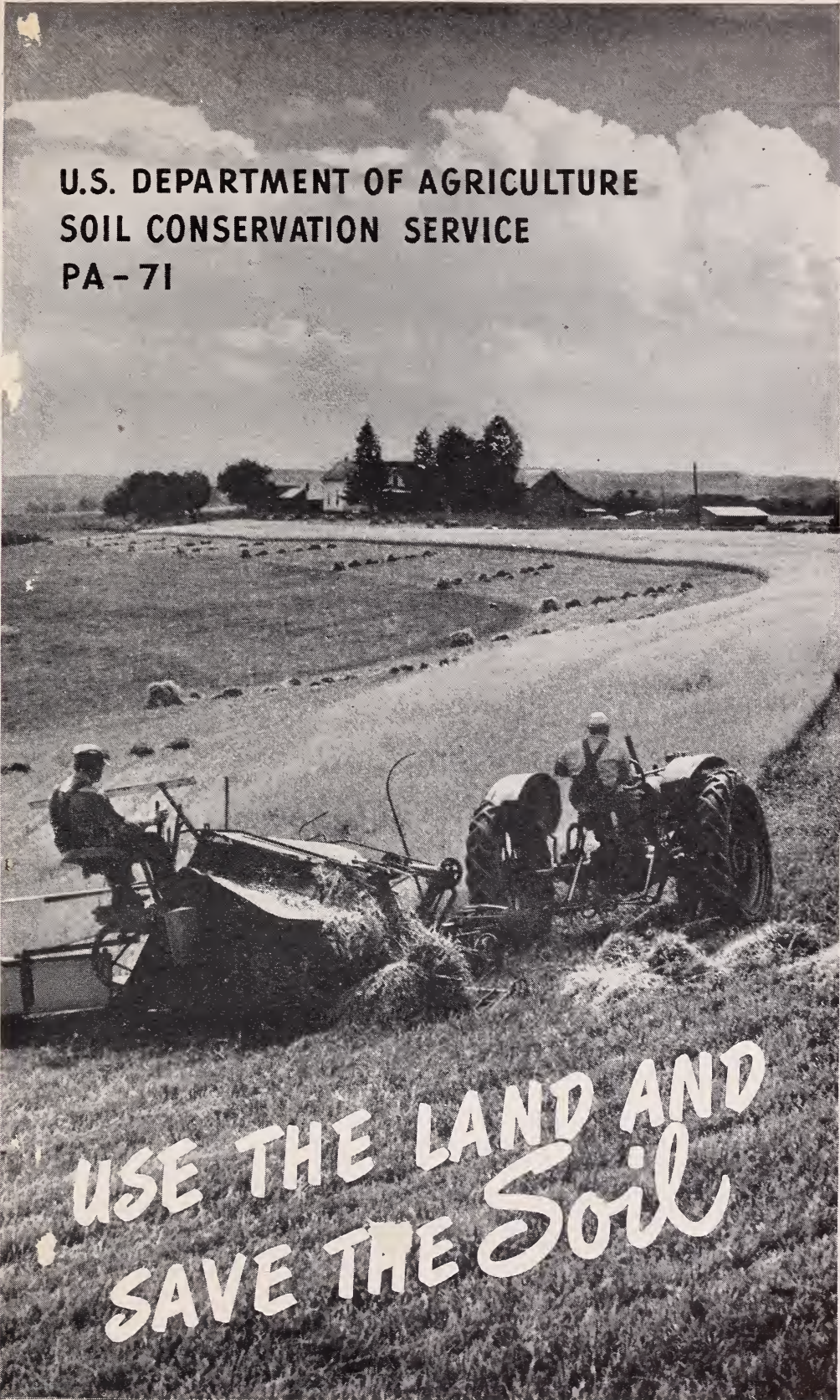


Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PA - 71



USE THE LAND AND
SAVE THE Soil



This land will not help much in producing your food, clothes, timber, and plastics. Thirty years ago it was good land but erosion damaged it so it was turned in for taxes.

MOST people agree that conservation of soil and water is necessary. They want to continue to eat well and to have raw materials for industry. They agree that conservation of our basic resources is as important to the city man as to the farmer because soil and water provide both city and country people with the necessities and many of the luxuries of life.

Most people recognize that soil conservation offers the only practical means of keeping our land productive and assuring a good standard of living for our increasing population. In 1930 the United States had 3.4 acres of cropland per person. By 1947, acres of cropland per person had dropped to 2.8. Our population is still increasing, while the amount of good land is decreasing. Without an adequate conservation program, we may soon find that we do not have enough land to support us at our present standard of living.

People know that soil and water conservation usually makes for better fishing and hunting and improves water supplies; that it helps keep sediment out of our streams and reservoirs, and helps reduce floods.

But, people often ask, just what is soil and water conservation? How does the Soil Conservation Service help farmers and landowners? This booklet gives a brief answer to these questions.

For more detailed information, see members of the governing body of your local soil conservation district, the nearest Soil Conservation Service office, or your county agent.

CONSERVATION IS USE OF RESOURCES WITHOUT WASTE

Washington, D. C.

Issued September 1949

USE THE LAND AND SAVE THE SOIL

By R. H. MUSSER, *Regional Conservator, Upper Mississippi Region, Soil Conservation Service*

How the Soil Conservation Service Operates

The Soil Conservation Service of the United States Department of Agriculture gives technical help to farmers and landowners who want to conserve or improve their land. It does this through local soil conservation districts. These districts are organized by farmers and landowners under State laws; they are administered by locally elected governing boards. Soil conservation districts are not Federal nor are they controlled by the Federal Government. They are subdivisions of State government, without taxing or bond-issuing power.

Each soil conservation district develops a work plan based on its local soil and water problems. It may call on any local, State, or Federal agency or other group for help. Usually it gets technical help in planning and applying soil conservation from the Soil Conservation Service and help on its educational program from the State



This swamp with a small muddy stream through it was once a lake supporting flour mills and a summer resort. Erosion from surrounding farm land filled the lake with sediment, destroying the local industry and lowering farm productivity—a double loss to the community.



Erosion undercut this bridge foundation. Such damages increase highway costs and public taxes.

extension service. Many districts get other kinds of help from various public or private groups.

The Soil Conservation Service is organized especially to give the most help possible to soil conservation districts. It has an office, usually called a work-unit, in each soil conservation district that has requested aid. In some of the larger districts it has more than one work-unit. A soil conservationist, commonly called a farm planner, is in charge of each work-unit. He may have special assistants; that depends on the amount of work and whether there are some special forestry, engineering, or other problems that require the services of a specialist in that field. The farm planner and his assistants spend most of their time helping farmers develop conservation plans for their entire farms and putting the plans into effect.

A district conservationist is in charge of the Soil Conservation Service's activities in a group of districts. His "work group" usually includes several work-units. The district conservationists and work-unit men working directly with farmers are by far the major part of the SCS staff.

A State conservationist administers Soil Conservation Service activities in each State and has a small business staff to handle the local clerical and administrative details for the other offices in the State.

Each regional headquarters gives technical and administrative help to field workers throughout several States. There are seven regions in the United States. Experienced technicians from the regional offices assist field men with difficult problems. They keep work-unit technicians informed on the latest developments in soils, agronomy, engineering, forestry, biology, farm management, and other sciences used in the soil and water conservation program. This system is effective because problems and solutions do not stop or change at State

or county lines or other man-made boundaries. The regional offices also reproduce aerial photographs, conservation-survey maps, land-capability maps, and farm conservation plan maps, and do drafting and furnish engineering designs which are most economically handled at that point. And they do much of the business work for the regions which are most efficiently and economically handled there.

The national headquarters in Washington gives general policy and administrative supervision to the SCS work in the United States and the territories. It has a relatively small staff because most administration and supervision is done by the regional offices, in order to maintain closer contact with the field units. Such a procedure speeds up the program and greatly reduces total costs to the public.

As a result of this type of organization the Soil Conservation Service has become recognized for its efficiency. It spends more than 92 percent of its money on direct assistance to farmers. Less than 8 percent of its appropriations go for so-called overhead necessary to enable the field men to do their job.

Modern Soil Conservation

Soil and water conservation is proper use and care of land and water. It means that a farmer uses each piece of land for the things it is best suited to produce over the years. At the same time he follows



Rotation crops on the more level land, strip cropping on the sloping land, hay and pasture on rolling land, and trees on land not suited to grain or meadow are good land use and keep this farm productive.

practices which will protect the land from damage and make the best use of water.

To do a complete job of soil and water conservation a farmer must control erosion. He must drain excess water from wet land that is to be used for crops and pasture. He must farm his land in such a way that the soil will not run together or "puddle" and keep a good supply of plant food and organic matter in the soil. He must handle irrigation water, where irrigation is used, in such a way that he will not waste water or damage the land.

In addition, he should manage his pastures and hay land to get better ground cover and more feed for livestock and he should manage the timber and wildlife resources and plan harvesting operations to insure continuous production from those areas.

Many different kinds of conservation measures are needed to do all these things. No one practice is enough to conserve soil and water on most agricultural land. A combination of practices usually is required. This means that a farmer should have a definite plan to make sure that one practice fits with another and all dovetail together on the farm as a whole.

Essentially the same procedure is followed as in building a house, where a blueprint is made to insure that all desirable features are included and all parts fit together properly. Such a blueprint for conservation operations on a farm is called a farm conservation plan.

If you own or operate a farm, you may request help from your local soil conservation district supervisors (or directors or commissioners, as they are known in some States). If they approve your application,



This board of directors of a soil conservation district meets regularly to direct affairs of the district.



A cooper with a soil conservation district (left) and farm planner go over final details of the farmer's complete plan to conserve soil and water.

they usually can arrange to give you the help of the Soil Conservation Service farm planner stationed in your district. You and the farm planner use the information provided by the SCS and your own knowledge about your land to determine the best and most profitable use and treatment of each piece of land.

You, as the farmer, determine your conservation plan. What it includes depends on your type of farming, the kind of livestock you produce, and your likes and dislikes. With the help of the technically trained farm planner, you develop and put into effect a plan—acre by acre and field by field—based on scientific facts. In preparing your plan, you probably will work with a group of your neighbors so the farm planner can help more farmers at the same time.

There's nothing hit-or-miss about the complete farm conservation plan. It is tailor-made to meet your needs, to fit your land, to protect every acre, and to enable you to farm more profitably. The plan is flexible so you can change it or improve it if this seems desirable.

When you have developed your complete farm conservation plan it will outline step by step how these land use changes and practices can be carried out. It will also include information about how to maintain the various conservation structures you build. Maintenance need not be costly or difficult. By doing it year to year as needed, you'll prevent costly repairs later on. This is especially true with maintenance of terraces and outlets, gully structures, grassed waterways, drainage systems, diversions, and ponds.

Know Your Land

Before you can make the best farm conservation plan, you must have a thorough knowledge of your land. Your plan is based upon putting each acre to its best use and treating every acre according to its needs. To obtain the necessary information about the land, a soil conservation surveyor goes over every acre of the farm. He studies



Soil conservation surveys reveal the amount of erosion that has occurred, the slope, and the kind of soil. Such surveys provide the basis for planning modern conservation farming.

the slope, amount of erosion, and kind of soil for each area. He records these on an aerial photograph of the farm. The farm planner then shows you how these various areas are classified into eight different classes of land. These are known as land-capability classes. Each is designated on the aerial photograph by a different color.

We find that all land falls into one of eight classes. For example, class I land is good soil, nearly level, that can be cultivated safely with ordinary good farming methods. About all you usually need to do on this kind of land is rotate your

crops, apply fertilizer and lime as needed, and plow under manure and crop residues. Class II includes good land that slopes gently. It must be protected by contouring, grassed waterways, and other simple measures. Other land that has some moderate deficiencies such as slow drainage is also in class II. Class III includes good land that is more subject to erosion or more difficult to farm than class II. It can be cultivated safely if the conservation plan also includes such practices as strip cropping or terracing. At the other extreme is class VIII land which is suitable only for wildlife or recreation because it is extremely steep, stony, sandy, wet, or severely eroded.

Your capability map may show that your farm contains only two or three of the eight land classes; or it may have all classes. This map and the knowledge of your land which you have gained by farming it give you and the farm planner the basic information you need to develop your conservation farm plan.

Use the Land Wisely

The more nearly you use the soil as nature intended, the more easily you can keep the valuable topsoil at home. Acres that are badly eroded or are on steep slopes and hillsides must be managed carefully. They may produce hay, pasture, or timber, but they cannot be expected to produce good corn or wheat.



Pasture improvement is part of a soil conservation program. It is one of the most profitable practices, often neglected.



Trees are the most profitable crop for much farm land. Farm woods provide a cash crop or save buying fuel, lumber, and posts.

For that reason, you use the more nearly level land for rotation crops, hay, and rotation pasture. You can cultivate these acres with less danger of erosion and can hold erosion to a small amount when the needed practices are used.

On some farms, you may have a piece of level productive land too wet for cropping. If it is the right kind of land and will repay the costs, you can drain it or improve the existing drainage system. This may enable it to produce half again, or double, as much as some of your other land is producing. By using the level drained land for crop production, you can put more of your sloping land in hay and pasture.

Your land-capability map helps you make these decisions.

Permanent Vegetation

Hay and Pasture. Permanent pasture or hay is the most profitable crop for much of your steep slopes, stony land, and badly eroded land. Grazing should be regulated so as to keep a good stand of grasses and legumes both for good forage and erosion control. Some permanent pasture must be fertilized, limed, and reseeded to a mixture of legumes and grasses before good cover can be established.

Woodland. Planting trees on land that is too steep, too severely eroded, or too wet or stony for other crops will usually give you the most profit. Harvesting mature trees, removing dead or diseased ones, and other good management methods will improve the woodland you now have. Woodland should not be pastured. It provides little feed. Pasturing also injures both young and old timber stands, keeps the trees from reproducing themselves, destroys the soil's ability to absorb rainfall, and may start gullies.

Wildlife. Shrubs, grasses, and trees on small patches of eroded land provide food and protective cover for wildlife. Your fence rows, drainage-ditch banks, marshes, pond areas, streambanks, wind-breaks, and woods borders can often be used most profitably in this way. This not only conserves soil but also wildlife. Useful wildlife on your farm helps pollinate clovers and fruit trees, helps control insect pests, provides variety in the family diet, and affords excellent recreation.

Cropland in Rotation

Most farmers use some of their cropland to produce grain crops. Intensive cropping with no cover crops, soil-improving crops, manure, or fertilizers, lowers soil productivity. It usually reduces organic matter, water-holding capacity, and plant nutrients. By using a rotation of grain and meadow crops adapted to your land, you can improve your soil and secure the same production from a smaller acreage of clean-tilled crops.

A common rotation on level land is the 3-year rotation of corn, small grain, and grass-legume mixture—1 year each. Longer rotations that include more years of grass-legumes are desirable on more erodible land (classes II and III). On such land you also need strip cropping or terracing and grassed waterways.

Farmers report that, in addition to building up the soil, grass-and-legume mixtures give better protection against soil washing. On heavy, tight soils they increase water absorption and improve drainage. The productivity of the soil, the length and steepness of the slope, the amount of erosion that has occurred, and your needs for livestock feed will determine the rotation you select.

Conservation Practices

Proper use of the land, rotations suited to the cropland, and soil improvement are essential parts of any conservation farm plan. You may need limestone and fertilizers to help establish good plant cover. They also help to put the soil in condition to withstand erosion and to produce higher crop yields. Lime and commercial fertilizer must be applied to much of the land before legumes can be grown and good rotations established. Barnyard manure, crop residues, and green manure return minerals and organic matter and enable soil to absorb more water.

Anything that checks the speed and quantity of runoff water is a barrier against erosion. Trees, grasses, and other close-growing crops are basic conservation practices because they are nature's way. Since man uses the soil more intensively than nature planned he must add man-made practices to hold it in place and keep it productive.

Contour tillage is farming around the hill on the level instead of up and down the hill. The hundreds of contour marks left by implements are dams or barriers against runoff and erosion. On fairly



Plowing under green manure adds fertility and organic matter and makes the soil more absorptive. This increases productivity and helps prevent erosion.



Grassed waterways carry water away safely and prevent gullyng.



Terraces act like eave troughs to stop runoff water and prevent erosion.

steep or long cultivated slopes, contouring should be used with strip cropping or terracing.

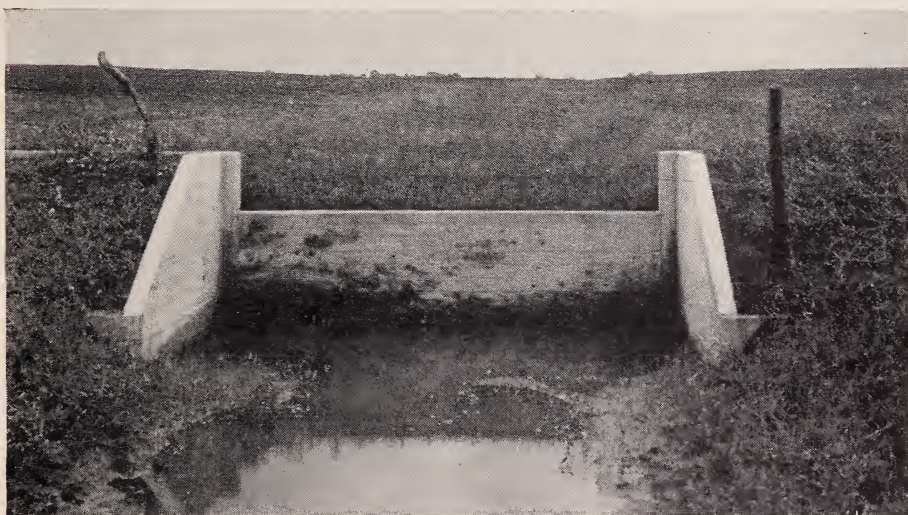
Contour strip cropping is farming on the contour with strips of close-growing meadow between strips of grain or cultivated crops. Runoff water from the cultivated or grain strip is checked and spread by the meadow strip before it develops enough speed to carry away much soil. Corn, small grain, and the erosion-controlling grass-legume mixtures are rotated among the strips in much the same manner as among square fields. Strips usually are from 50 to 150 feet wide.

Grassed waterways are the low natural drainageways or specially prepared water courses down a slope which are kept in dense, permanent sod. Without grass to form a channel lining to these drainageways, they will erode to form deep gullies.

Terraces collect water from the land above and lead it around the hill to a grassed waterway or other well-vegetated area. A series of well-constructed terraces on a hillside will help reduce soil losses. Terraces are smoothly rounded ridges, about 15 to 18 inches high with a channel above the ridge. Their over-all width, including both ridge and channel, is about 35 feet. They do not interfere with operation of machinery if they are properly built.

Gully control. It is usually necessary to treat both the gully and its drainage area to permanently control a gully. Grass should be established in the gully as quickly as possible. Excess water should be kept out of the gully with dikes, terraces, or other methods to make it easier for the grass to get started. Structures often are needed in large gullies. After active gullies are brought under control, a good soil conservation program should prevent gullying in the future.

Drainage sometimes is an important part of the water-disposal system. The drainage system may consist of open ditches or tile, or



This concrete structure in lower part of former gully helps hold soil while grass gains a foothold to prevent further erosion.

both. It takes excess moisture out of wet but otherwise productive land so that it can be farmed.

Farm ponds sometimes are the best use for a certain piece of land. They provide livestock water and may produce good fishing and other recreation. A conservation plan on land which drains into the pond will help protect it from silting. Adequate overflow spillways must be provided to prevent the earth dam from washing out during heavy rains. Ponds should be fenced and livestock water piped to a nearby tank so the pond will not be damaged by livestock. The pond area should be planted to shrubs, grasses, and trees to attract useful wildlife.

The conservation practices described here are some of the more common ones in the upper Mississippi region. Actually there are about 60 which may be used. Only a few ordinarily are needed, however, to make up the complete conservation farm plan for any one farm.

Soil Conservation Pays

Research by Soil Conservation Service and State college experiment stations shows that soil and water conservation usually increases yields and income the first year it is applied. The experiences of thousands of farmers show the same thing. As time passes the benefits increase.

Farmers report that contour farming increases yields and reduces machinery and fuel costs. It often results in longer rows and fewer



Farm ponds often are best use of a certain piece of land. They provide stock water and recreation.

turns. Elimination of gullies reduces machinery repairs, saves time, and may prevent serious accidents.

Improved pasture and hay mixtures give better control of erosion and yield more tons of forage with higher feed value. Thus the farmer can produce more meat per acre, at less cost per pound, and have livestock do more of the harvesting work.

Farm records kept for 8 years on 25 Illinois farms where the farmers followed complete conservation plans were compared with those of 25 similar farms in the same area where the old methods were used. Net returns per acre averaged \$17.09 on the conservation farms and \$11.48 on the others.

A study of 252 conservation farms and 251 farms without soil conservation in Illinois, Indiana, Iowa, Ohio, and Wisconsin in 1945, showed that the conservation farms netted \$5.63 more per acre than the nonconservation farms. Both livestock production and crop yields were higher as a result of the complete farm conservation plan. Corn yields were 6.6, soybeans 2.8, oats 3.9, and wheat 3.3 bushels more per acre on soil-conserving farms. On badly depleted farms the increase resulting from the use of soil conservation is usually much higher, farmers report.

Flood Control

In addition to protecting land and water resources for continued production, conservation also is part of the Nation's flood-control program. The idea of connecting complete watershed treatment with downstream channel improvement so they help each other is now recognized by most flood-control authorities.

Flood control should start where the rain falls. The Soil Conservation Service and other agencies are tackling the problem at its beginning. Conservation farming makes more water soak into the soil, thereby decreasing and retarding the runoff from sloping fields, pastures, and woodlands.

Floods result from the accumulation of runoff from the areas draining into the stream. For that reason, the more water that can be stored in the soil, and otherwise managed properly, the less will be the flood damage to crops, buildings, and other improvements in the bottom land and to reservoirs and channel improvements downstream. Naturally, the effect of conservation measures is greater where the soils are deep and absorb water more readily. Also, soil conservation on upland is more effective for control of the more frequent, less intense floods than for the less frequent large ones.

In watersheds authorized by Congress for flood-control operations, the Soil Conservation Service also helps install measures primarily for flood control. These measures lower the water from farm land to the stream in an orderly way. Further, they support and protect conservation measures applied on the upland areas above them. As usual, the SCS works through soil conservation districts on this phase of the program. These measures are part of the flood-control program. They are primarily for the benefit of lands and towns downstream, but also of benefit to the farm land adjoining them. Thus their cost is shared by Federal and local governments and by landowners.

Soil conservation and these special measures, primarily for flood control in farm watersheds, start where the large measures on major streams leave off. Combining these three types of control gives protection to the area from the rim of the watershed to the major stream outlet. The major stream measures such as levees, dikes, reservoirs, dams, and similar flood-control measures are under the direction of the Corps of Engineers, Department of the Army.

Such watershed-treatment programs are under way in some areas. Work will start on others as they are authorized by Congress and as money is appropriated for that purpose.

Soil and water conservation alone will not control floods. But such a program, applied to 90 percent or more of the land in a watershed, coupled with the necessary flood-control structures in the tributary areas, will materially reduce flood damages. Reduction in runoff may be as small as 5 percent or as great as 40 percent or more depending on the size of the storm, the watershed, and other conditions. Equally important in reducing flood damage is a decrease of 40 to 90 percent in the amount of sediment deposited on flooded land and cities.



More steaks for more people come as a result of more grain and forage per acre when modern conservation farming is practiced. Soil and water conservation pays dividends.

